REMARKS

The Office Action of June 13, 2005 and the references cited therein have now been carefully studied. Reconsideration and allowance of this application are earnestly solicited.

The present invention is directed to a method as well as a system for noise reduction or removal of noise in the presence of a speech or any other information signal. It is desired to reduce or remove the noise while preserving the speech or other information signal. To accomplish this end, the present invention utilizes a non-Gaussian distribution function model directed at the information signal. The non-Gaussian distribution function model of the information signal is dynamically updated during processing. It is noted that all of the processing is accomplished in the frequency domain, including the steps as well as a device for decomposing the input signal including both the information as well as noise component into multiple spectral bands utilizing Fourier transforms.

The Examiner has rejected all of the claims, i.e., claims 15-39 under 35 USC §103(a) as being unpatentable over the articles to Lee et al. in view of U.S. Patent 6,415,253 to Johnson. With respect to independent claim 15, directed to the method of extracting the information signal from an input signal including noise, as well as claim 33, directed to the system for accomplishing this end, the Examiner has indicated that the article to Lee et al. utilizes the estimation of a non-Gaussian distribution function model as well as dynamically updating the non-Gaussian distribution function model for the information signal, estimating the information signal using an estimation-maximization algorithm and obtaining the estimated information by filtering the information signal through a Kalman filter. The Examiner has indicated that article to Lee et al. does not disclose

decomposing the input signal into multiple spectral bands, applying a gain function to each of the spectral bands to the input signal spectral bands to produce estimated information signal components to each of the spectral bands and then combining the estimated information signal components for each of the spectral bands to produce an estimate of the information signal with reduced noise. The Examiner has indicated that the patent to Johnson would teach these steps or functions. The Examiner further indicated that the patent to Johnson would utilize Fourier transforms in the decomposing step and function. This rejection is respectfully traversed.

As previously indicated, the present invention is directed to, and claims, a method and system for extracting an information signal from an input signal containing both the information signal and noise. As specifically recited in the independent claims, the input signal would be decomposed into multiple spectral bands utilizing Fourier transforms. This is in contradistinction to the system described in the Lee et al. article in which a Kalman filter is used to determine an estimation of the information signal at a current time based upon the estimation from the previous time, as well as a current measurement. As described therein, the Lee et al. algorithm is purely a time domain filter. The Examiner has recognized this in the lines bridging pages 2 and 3 of the Office Action, where it is indicated that the estimated information is obtained by filtering the information signals through a Kalman filter.

The algorithm described in the Lee et al. article is easily distinguished from the algorithm described in the present invention as well as the system recited in the patent to Johnson in which an information signal is extracted from a noisy environment in strictly a frequency domain. Applicant has amended independent claims 15 and 33 to specifically recite a method as well as a

system for extracting an information signal from an input signal containing both the information signal and noise by decomposing the input signal into multiple spectral bands, utilizing a Fourier transforms. This is in contradistinction to the Kalman filter employed in the Lee et al. algorithm.

It is respectfully submitted that it would not be obvious to combine the teachings of the Lee et al. system with the system described in the patent to Johnson. As previously mentioned, the algorithm described in the Lee et al. article operates strictly in the time domain employing a Kalman filter. This is in contradistinction from the system illustrated in the Johnson patent which operates completely in the frequency domain. Therefore, one possessing ordinary skill in the art would not combine the teachings of the Lee et al. reference with the system shown in the Johnson patent due to the fact that the Lee et al. reference operates only in the time domain and the Johnson patent operates only in the frequency domain.
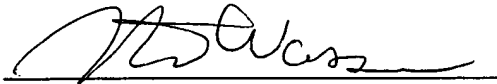
The combination of these two references would also be refuted by the fact that the algorithm in the Lee et al. article would produce an estimation of the information signal by filtering the information signal through the Kalman filter. Therefore, the addition of the steps suggested by the Examiner in the first full paragraph of page 3 of the Office Action would be duplicative since decomposing the input signal into multiple spectral bands, producing a gain function of each of the spectral bands, applying the gain function for each of the spectral bands to the input signal to produce the estimated information components for each of the spectral bands would merely duplicate the estimation steps of the Lee et al. reference, resulting in the production of a second estimation of the same information signal.

Therefore, it is believed that the present invention, as recited in the enclosed amended claims, would not be obvious in view of the references to Lee et al. and Johnson.

Consequently, reconsideration and allowance of this application are earnestly solicited.

A three month extension of time accompanies this Amendment, along with a check for the required fee. If any additional fees are due and owing, please charge Deposit Account No. 08-2455 the deficiency.

Respectfully submitted,

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